IN THE CLAIMS

1. (Currently amended) A method for determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, the method comprising the steps of:

generating test communications in the system in accordance with a selected pattern;

collecting end-to-end path measurement data utilizing the generated test communications; and

transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein the selected pattern is determined at least in part utilizing a flow matrix selection algorithm; and

wherein the flow matrix selection algorithm maintains a list of end-to-end paths and processes said list such that a plurality of non-end-to-end paths for which performance indicators can be generated are determined.

2. (Original) The method of claim 1 wherein a given one of the test communications is directed between a first one of the endpoint devices and a second one of the endpoint devices.

3. (Currently amended) ~~The method of claim 1~~ A method for determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, the method comprising the steps of:

generating test communications in the system in accordance with a selected pattern;

collecting end-to-end path measurement data utilizing the generated test communications; and

transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein for a given time interval the collected end-to-end path measurement data is characterized by the equation:

$$\mathbf{y} = \mathbf{A}\mathbf{x}$$

where **y** is a vector of end-to-end path measurements, **A** is a flow matrix defining the selected pattern, and **x** is a vector of ~~network link level~~ performance indicators.

4. (Original) The method of claim 3 wherein the transforming step comprises utilizing **y** and **A** to solve the equation for **x**.

5. (Original) The method of claim 1 further comprising repeating the generating, collecting and transforming steps for each of a plurality of time intervals.

6. (Currently amended) The method of claim 5 wherein the end-to-end path measurement data corresponding to the one or more test communications generated for an *i*th time interval t_i is of the form:

$$\mathbf{y}_i = \mathbf{A}_i\mathbf{x}_i$$

where $\mathbf{y}_i$ is a vector of end-to-end path measurements collected for the *i*th time interval, $\mathbf{A}_i$ is a flow matrix defining the selected pattern for the *i*th time interval, and $\mathbf{x}_i$ is a vector of ~~network link level~~ performance indicators for the *i*th time interval.

7. (Original) The method of claim 1 wherein at least one of the performance indicators comprises a binary indicator, the binary indicator taking on a first value to indicate that a corresponding link is not associated with a performance problem, and taking on a second value to indicate that the corresponding link is associated with a performance problem.

8. (Original) The method of claim 1 wherein a network of the network-based communication system has a topology characterized by a connected network topology graph G =

(D, L) where D is a set of nodes and L is a set of links, and where a given path in G comprises a sequence of links from the set L.

9. (Original) The method of claim 8 wherein a node in G having an endpoint device associated therewith is designated as a leaf, and a set $E \subset D$ denotes the set of leaves in G, and further wherein a path in G that lies between leaves comprises an end-to-end path, and a set P for a given G and E denotes the set of all end-to-end paths in G between endpoint devices in E.

10. (Currently amended) ~~The method of claim 1~~ A method for determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, the method comprising the steps of:

generating test communications in the system in accordance with a selected pattern;

collecting end-to-end path measurement data utilizing the generated test communications; and

transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein the selected pattern is defined by a flow matrix having rows representing end-to-end paths for which measurement data is collected in the collecting step, and columns representing single-link or multiple-link non-end-to-end paths for which performance indicators are determined in the transforming step.

11. (Original) The method of claim 10 wherein the flow matrix comprises an $n \times m$ matrix wherein for $0 < i \leq n$ and $0 < j \leq m$, $m_{i,j}$ denotes the number of times the end-to-end path in row i traverses the non-end-to-end path in column j.

12. (Original) The method of claim 10 wherein the flow matrix comprises a singular matrix.

13. (Original) The method of claim 10 wherein the flow matrix comprises a non-singular matrix.

14. (Original) The method of claim 1 wherein the selected pattern is determined at least in part based on a reduced network topology generated by applying a network topology reduction process to a graph representative of a topology of a network of the network-based communication system, the network topology reduction process determining one or more non-end-to-end paths within the network which carry the same traffic flow.

15. (Canceled)

16. (Canceled)

17. (Currently amended) ~~The method of claim 15~~ A method for determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, the method comprising the steps of:

generating test communications in the system in accordance with a selected pattern;

collecting end-to-end path measurement data utilizing the generated test communications; and

transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein the selected pattern is determined at least in part utilizing a flow matrix selection algorithm;

wherein the flow matrix selection algorithm is configurable to accept one or more constraints on selection of particular paths in generating a given flow matrix.

18. (Currently amended) An apparatus for use in determining the location of a performance problem in a network-based communication system, the system comprising a plurality of endpoint devices, the apparatus comprising:

a controller comprising a processor coupled to a memory;

the controller being associated with one or more of the endpoint devices, and being operative to control: (i) generation of test communications in the system in accordance with a selected pattern, (ii) collection of end-to-end path measurement data utilizing the generated test communications, and (iii) transformation of the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein the selected pattern is determined at least in part utilizing a flow matrix selection algorithm; and

wherein the flow matrix selection algorithm maintains a list of end-to-end paths and processes said list such that a plurality of non-end-to-end paths for which performance indicators can be generated are determined.

19. (Original) The apparatus of claim 18 wherein the controller comprises a centralized controller which communicates with the plurality of endpoint devices over a network.

20. (Original) The apparatus of claim 18 wherein the controller comprises a distributed controller which is implemented at least in part utilizing one or more of the endpoint devices.

21. (Currently amended) An article of manufacture comprising a machine-readable storage medium containing software code for use in determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, wherein the software code when executed implements the steps of:

generating test communications in the system in accordance with a selected pattern;

collecting end-to-end path measurement data utilizing the generated test communications; and

transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern;

wherein the selected pattern is determined at least in part utilizing a flow matrix selection algorithm; and

wherein the flow matrix selection algorithm maintains a list of end-to-end paths and processes said list such that a plurality of non-end-to-end paths for which performance indicators can be generated are determined.